REMARKS

I. Introduction

By the present Amendment, claims 1-6 have been amended. Claims 7-25 have been cancelled, without any prejudice or disclaimer to the subject matter recited therein. Claims 26-29 are newly presented for consideration. Accordingly, claims 1-6 and 2-29 are now pending in the application. Claims 1 and 26 are independent.

II. Office Action Summary

In the Office Action of July 26, 2007, the Drawings were objected to because of various informalities. Claims 1 and 16 were objected to under 37 CFR §1.75(a) as failing to particularly point out and distinctly claim the subject matter regarded as the invention. Claims 1, 4, 5, 7, 10, 12, 14, 16-18, and 21-23 were rejected under 35 USC §102(b) as being anticipated by Ko et al. ("Ko"). Claim 2 was rejected under 35 USC §103(a) as being unpatentable over Ko in view of Henry et al. ("Henry"). Claim 3 was rejected under 35 USC §103(a) as being unpatentable over Ko in view of U.S. Patent No. 6,801,650 issued to Kikuchi et al. ("Kikuchi"). Claims 6, 11, 15, 19, 20, 24, and 25 were rejected under 35 USC §103(a) as being unpatentable over Ko in view of Xu et al. ("Xu"). Claims 8, 9, and 13 were rejected under 35 USC §103(a) as being unpatentable over Ko in view of U.S. Patent No. 7,035,447 issued to Take.

The cancellation of claims 7-25 has rendered most of these grounds of rejection moot. Regarding the remaining claims, these rejections are respectfully traversed.

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III.　Objections to the Drawings

The Drawings were objected to under 37 CFR §1.121(d) because of various informalities.　Regarding this objection, the Office Action indicates that Figs. 1B and 11 contain typographical errors.　The Office Action further requested submission of corrected drawing sheets.

Concurrently submitted herewith, are two drawing sheets containing, in part, Figs. 1B and 11.　The Replacement Drawing Sheets correct the typographical errors identified in the Office Action.

Withdrawal of this objection is therefore respectfully requested.

IV.　Claims Objections

Claims 1 and 16 were objected to under 37 CFR §1.75(a) for failing to particularly point out and distinctly claim the subject matter regarded as the invention.　Regarding this objection, the Office Action cites various phrases that were believed to be confusing and/or otherwise difficult to interpret.

At the outset, Applicants note that the objection is raised with respect to claims 1 and 16.　In discussing the phrases that were considered confusing, however, the Office Action mentions numerous additional claims.　By the present Amendment, Applicants have cancelled various claims and made changes to the pending claims, in part, to improve the clarity and address the issues raised in the Office Action.

It is therefore respectfully submitted, that, as amended, the presently pending claims satisfy the requirements of 37 CFR §1.75(a).　Withdrawal of this objection is therefore respectfully requested.

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V.   Rejections under 35 USC §102

Claims 1, 4, 5, 7, 10, 12, 14, 16-18, and 21-23 were rejected under 35 USC

§102(b) as being anticipated by Ko. Regarding this rejection, the Office Action

alleges that Ko discloses a method of classifying defects that includes all of the

features recited in the claimed invention. The Office Action specifically alleges that

Ko discloses obtaining a defect image by taking a picture of a sample, extracting a

characteristic amount of defects from the defect image, preparing at least on

classification model, and classifying the defects of which the characteristic amount is

extracted by at least one type of classification model. Applicants respectfully

disagree.

As amended, independent claim 1 defines a method for classifying defects

that comprises:

> obtaining an image of a defect on a sample;
>
> extracting a characteristic of the defect from the image;
>
> classifying the defect in accordance with the extracted characteristic, and based on a rule-based classification classifying the defect in accordance with the extracted characteristic and based on a rule-based classification and a learning type classification;
>
> calculating a set of first likelihoods of the defect belonging to each of a plurality of defect classes of the rule-based classification, by use of the extracted characteristic;
>
> calculating a set of second likelihoods of the defect belonging to each of a plurality of defect classes of the learning type classification, by use of the extracted characteristic;
>
> calculating a third set of likelihoods of the defect belonging to each of the defect classes of the learning type classification, by use of the first and second likelihoods; and
>
> classifying the defect by use of the third likelihoods.

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According to the method of independent claim 1, an image of a defect on a sample is obtained. A characteristic of the defect is extracted from the image. The defect is then classified in accordance with the extracted characteristic, and based on a rule-based classification and a learning type classification. Further, according to independent claim 1, the method requires calculation of a set of first likelihoods of the defect belonging to each of a plurality of defect classes of the rule-based classification using the extracted characteristic. A set of second likelihoods is calculated that the defect belongs to each of a plurality of defect classes of the learning type classification using the extracted characteristic. A set of third likelihoods is calculated that the defect belongs to each of the defect classes of the learning type classification using the first and second likelihoods. Finally, the defect is classified using the third likelihoods.

The Office Action alleges that Ko discloses all of the features recited in independent claim 1. This does not appear to be the case. Ko discloses a hierarchy based classification system that utilizes two modules of different hierarchy. A neural network clustering module is used in conjunction with a fuzzy rule-based classification module. Ko appears to utilize the classification results of the LVQ neural network as input for the fuzzy rule-based classification module. The final classification results are obtained by the fuzzy classification module. See page 94, col. 1, lines 27-33. When hierarchical schemes such as the one used by Ko are implemented, the results of the first stage classifier can greatly influence the final result determined in the second stage, because they are used as inputs to the second (e.g., fuzzy) module. Consequently, such influences can greatly effect the classification of the defects.

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In contrast, however, the claimed invention calculates two sets of likelihoods

for the defect classes, and subsequently makes the classification determination

based on simultaneous application of both classification results. Such features are

not shown or suggested by the art of record. More particularly, Ko fails to provide

any disclosure or suggestion for features recited in independent claim 1, such as:

> calculating a set of first likelihoods of the defect belonging to
> each of a plurality of defect classes of the rule-based classification,
> by use of the extracted characteristic;
> calculating a set of second likelihoods of the defect
> belonging to each of a plurality of defect classes of the learning
> type classification, by use of the extracted characteristic;
> calculating a third set of likelihoods of the defect belonging to
> each of the defect classes of the learning type classification, by use
> of the first and second likelihoods, and
> classifying the defect by use of the third likelihoods.

It is therefore respectfully submitted that independent claim 1 is allowable

over the art of record.

Claims 2-6 depend from independent claim 1, and are therefore believed

allowable with respect to independent claim 1. In addition, these claims each

introduce novel elements that independently render them patentable over the art of

record.

Independent claim 26 is newly presented and defines an apparatus for

classifying defects that comprises:

> imaging means for obtaining an image of a defect on a
> sample;
> means for extracting a characteristic of the defect from the
> image;
> means for classifying the defect in accordance with the
> extracted characteristic, and based on a rule-based classification
> and a learning type classification; and
> a display for displaying the image of the defect and the

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classification result on a screen,

wherein said classifying means comprises:

a rule-based classification apparatus for calculating a set of first likelihoods of the defect belonging to each of plurality of rule classes by use of the characteristics of the defect,

a learning type classification apparatus for calculating a set of second likelihoods of the defect belonging to each of a plurality of defect classes by use of the characteristic of the defect, and

a classification model for calculating a set of third likelihoods of the defect belonging to each of said defect classes, by use of the first and second likelihoods.

The apparatus of independent claim 26 includes various components capable of performing the steps recited in independent claim 1. According to at least some of the features of independent claim 26, a rule-based classification apparatus is used to calculate a set of first likelihoods that the defect belongs to each of a plurality of rule classes. A learning type classification apparatus is used to calculate a set of second likelihoods that the defect belongs to each of a plurality of defect classes. Further, a classification model is provided for calculating a set of third likelihoods that the defect belongs to each of the defect classes based on the first and second likelihoods. As previously discussed, these particular features are not shown or suggested by the art of record.

It is therefore respectfully submitted that independent claim 26 is allowable over the art of record.

Claims 27-29 depend from independent claim 26, and are therefore believed allowable for at least the reasons set forth above with respect to independent claim 26. In addition, these claims each introduce novel elements that independently render them patentable over the art of record.

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VI.   Conclusion

For the reasons stated above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a Notice of Allowance is believed in order, and courteously solicited.

If the Examiner believes that there are any matters which can be resolved by way of either a personal or telephone interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

AUTHORIZATION

Applicants request any shortage or excess in fees in connection with the filing of this paper, including extension of time fees, and for which no other form of payment is offered, be charged or credited to Deposit Account No. 01-2135 (Case: 500.43701X00).

Respectfully submitted,
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Attachments:　　　　Replacement Sheets (2)

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